

# 99-Second Stopwatch and Timer

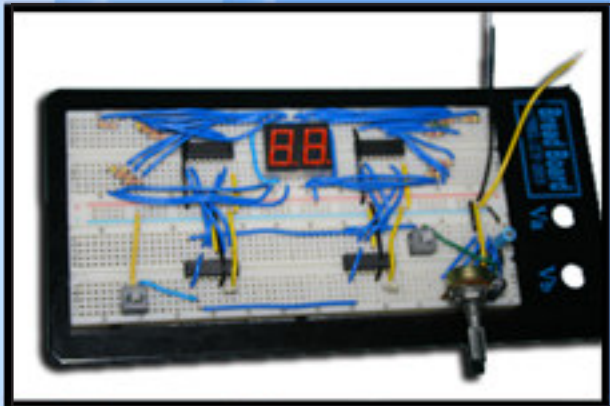
## Descriptive Analysis of the Circuit

The prototype, 99-second timer and stopwatch, is a time-setting device that can be preset to start or stop something at a given time. It is used for measuring and showing time running within 99 seconds. Two seven-segment light-emitting diodes (LEDs) are used since the device is anticipated to two numerical digits for counting. Upon execution, the circuit counts from 00-99 seconds.

## Circuit Specifications

The concepts used in this programmed circuit are seen with the profound investigation of the laboratory experiment in the course COE004L, *Binary Counters*.

Binary counters count into sequence from 0000 to 1001, or the Binary Count to Decimal (BCD). As the programmer studied about the integrated circuit 74LS90, they have found out how to operate it normally. At least one of the reset9 inputs (pins 6 and 7) must be connected to low (L) for counting to occur. For counting to start from zero (0000), at least one of the reset0 pins 2 and 3 must be connected to low. It also has two clocks, namely the clock A and the clock B. For normal operation, the clock A is connected to the pulse or the count input and the clock B is shorted to the first output, QA. Looking further, the programmers have seen that it also has the outputs namely QA, QB, QC and QD, which are actually the inputs of a BCD to seven-segment display decoder. These outputs were then connected in conjunction with the integrated circuit 74LS47.



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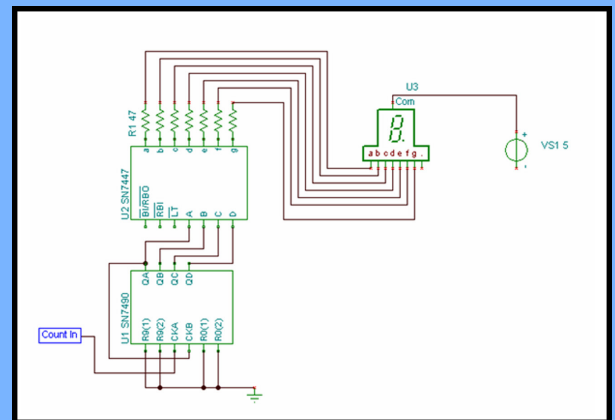
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The pulse used is the astable multivibrator of LM 555. The variable resistance is set to a second interval pulse. However, changing the resistance either makes the counting fast or slow. This serves as the frequency change of the function generator.



**Note:** Adding another digit requires a programmer to build another circuit like this. Connect the QD output of the 74LS90 to the clock A of the second-built circuit.